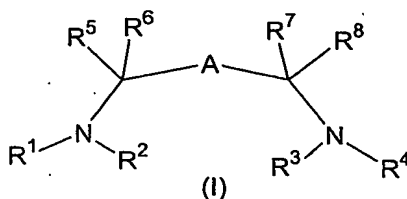


Claims.

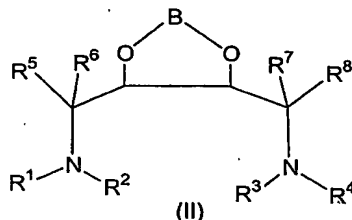
1. A chiral catalyst comprising the reaction product of a group 8 transition metal compound a chiral phosphine and a chiral diamine of formula (I)



in which R^1 , R^2 , R^3 or R^4 are independently hydrogen, a saturated or unsaturated alkyl, or cycloalkyl group, an aryl group, a urethane or sulphonyl group and R^5 , R^6 , R^7 or R^8 are independently hydrogen, a saturated or unsaturated alkyl or cycloalkyl group, or an aryl group, at least one of R^1 , R^2 , R^3 or R^4 is hydrogen and A is a linking group comprising one or two substituted or unsubstituted carbon atoms.

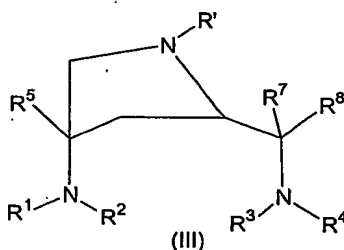
2. A catalyst according to claim 1 wherein the group 8 metal compound is a compound of ruthenium.
3. A catalyst according to claim 1 or claim 2 wherein the chiral phosphine is a chiral bis(phosphine).
4. A catalyst according to claim 3 wherein the chiral bis(phosphine) is P-Phos, tol-P-Phos or xyl-P-Phos.
5. A catalyst according to any one of claims 1 to 4 wherein R^1 , R^2 , R^3 and R^4 are the same or different and are selected from hydrogen, methyl, ethyl, isopropyl, cyclohexyl, phenyl or 4-methylphenyl groups.
6. A catalyst according to any one of claims 1 to 4 wherein R^1 and R^2 are linked or R^3 and R^4 are linked so as to form a 4 to 7-membered ring structure incorporating the nitrogen atom.
7. A catalyst according to any one of claims 1 to 6 wherein R^5 , R^6 , R^7 and R^8 are the same or different and are selected from hydrogen, methyl, ethyl, propyl, iso-propyl, butyl, iso-butyl, sec-butyl, tert-butyl, cyclohexyl or substituted or unsubstituted phenyl or naphthyl groups.
8. A catalyst according to any one of claims 1 to 6 wherein one or more of R^5 , R^6 , R^7 or R^8 form one or more ring structures with the linking group A.

9. A catalyst according to any one of claims 1 to 8 wherein a substituting group on the carbon atom of linking group A is alkyl (C1-C20), alkoxy (C1-C20) or amino or forms one or more ring structures incorporating one or more carbon atoms making up the linking group.
10. A catalyst according to any one of claims 1 to 4 wherein the chiral diamine is of formula (II)



wherein B is a linking group comprising one or two substituted or unsubstituted carbon atoms.

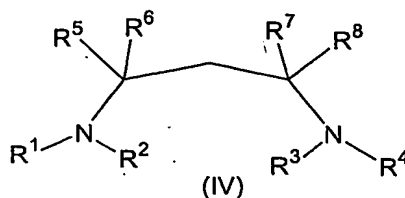
11. A catalyst according to claim 10 wherein R^1, R^2, R^3, R^4 are hydrogen, R^5, R^6, R^7 and R^8 are hydrogen or alkyl groups and B comprises $C(CH_3)_2$ or $(CH_3)(OCH_3)C-C(CH_3)(OCH_3)$.
12. A catalyst according to claim 10 or claim 11 wherein the chiral diamine is selected from 3-Aminomethyl-5,6-dimethoxy-5,6-Dimethyl[1,4]-dioxan-2-yl]-methylamine (DioBD) or 2,3-O-isopropylidenebutane 1,4 diamine (DAMTAR).
13. A catalyst according to any one of claims 1 to 4 wherein the chiral diamine is of formula (III)



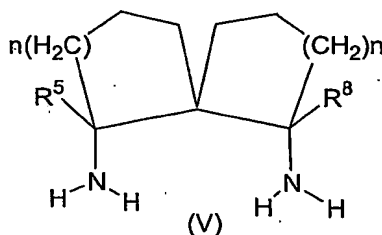
wherein R' is a protecting group.

14. A catalyst according to claim 13 wherein R^1, R^2 and R^5 are hydrogen, R^3 and R^4 are hydrogen or alkyl, R^7 and R^8 are hydrogen, alkyl or aryl and R' is selected from an alkyl, aryl, carboxylate, amido or sulphonate protecting group.
15. A catalyst according to claim 13 or claim 14 wherein the chiral diamine is 4-Amino-2-aminomethylpyrrolidine-1-carboxylic acid *tert*-butyl ester (PyrBD).

16. A catalyst according to any one of claims 1 to 4 wherein the chiral diamine is of formula (IV)



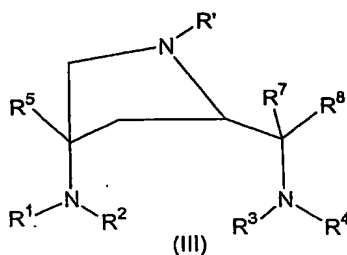
17. A catalyst according to claim 13 wherein R^1 , R^2 , R^3 , R^4 , R^6 , R^7 are hydrogen and R^5 and R^8 are aryl or substituted aryl groups.
18. A catalyst according to claim 16 or claim 17 wherein the chiral diamine is Diphenyl-1,3-propanediamine (Dppn).
19. A catalyst according to any one of claims 1 to 4 wherein the chiral diamine is of formula (V).



wherein $n = 1$ or 2 .

20. A catalyst according to claim 15 wherein R^5 and R^8 are hydrogen.
21. The use of catalysts of claims 1 to 20 for the asymmetric hydrogenation of ketones and imines.
22. The use of catalysts according to claim 21 for the hydrogenation of alkyl ketones of formula $RCOR'$ in which R and R' are substituted or unsubstituted, saturated or unsaturated C1-C20 alkyl or cycloalkyl which may be linked and form part of a ring structure.

23. A chiral diamine of formula (III)



wherein R^1 , R^2 , R^3 or R^4 are independently hydrogen, a saturated or unsaturated alkyl, or cycloalkyl group, an aryl group, a urethane or sulphonyl group and R^5 , R^7 or R^8 are independently hydrogen, a saturated or unsaturated alkyl or cycloalkyl group, or an aryl group, at least one of R^1 , R^2 , R^3 or R^4 is hydrogen and R' is a protecting group.

24. A diamine according to claim 23 wherein R^1 , R^2 and R^5 are hydrogen, R^3 and R^4 are hydrogen or alkyl, R^7 and R^8 are hydrogen, alkyl or aryl and R' is selected from an alkyl, aryl, carboxylate, amido or sulphonate protecting group.

25. A diamine according to claim 23 or claim 24 wherein the chiral diamine is 4-Amino-2-aminomethylpyrrolidine-1-carboxylic acid *tert*-butyl ester (PyrBD).